



Creating Visual Excellence for the Web.

A Whitepaper by Wes Moore, founder, iPlayerHD.com

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[Why use iPlayer?](#)

iPlayerHD is a tool that allows anyone to easily and affordably deliver exceptional quality video to the Internet. Using iPlayer's many tools, you can deliver exceptional video to video players you have previously embedded in your website or you can deliver video using the iPlayer screen and web page. In fact, you can do both. iPlayer is as flexible as your needs. Place simple links on your existing website and with the click of a mouse, your website visitors are now able to view your videos and the messages they contain with a visual quality that far surpasses traditional online video. You can build multiple iPlayers with an unlimited number of channels, up to the 5GB storage limit in your basic iPlayer account. For both SD and HD video, iPlayerHD provides an experience far beyond what your site visitors have been accustomed to.

Every iPlayer has four distinct sections. Use the iPlayer Home Page or More Info pages as your guide. At the top, you see the iPlayer logo. You'll replace that with your logo or company name. Under the logo area is the video screen. iPlayer's screen resolution is 768 x 432, which is about 2.5 times larger than the typical 320 x 240 player found on most websites. It has a 16:9 ratio but respects all ratios, including 4:3, which is centered neatly and surrounded by black bars. Note: You do not need to resize your 16:9 videos to 768 x 432. No matter your video's height and width, iPlayer will respect its native aspect ratio and will display it neatly in the screen. Full screen mode is as large as your monitor's resolution.

Immediately below the screen is a branding area where you will easily place content using our rich text editor. Treat it like a web page. Each iPlayer is branded by you, for you, with no outside advertising interfering with your message. Below the branding area are up to 12 channels represented as thumbnails. Clicking on a thumbnail instantly plays that video on your screen. There is no limit to the number of channels. Should an iPlayer have more than 12 channels, a "Next" link is located at the bottom of the channel area that leads to the next group of channels.

[Adobe Streaming Server Technology](#)

iPlayer uses the latest Adobe Streaming Video Server technology including [instant-on](#) and [bandwidth detection](#). Instant on means little or no waiting for the video to play. Bandwidth detection technology instantly detects your visitor's bandwidth and delivers the appropriate video, up to 3 mbps. You simply upload multiple bit rates of each video. We'll do the rest!

iPlayer also uses the RTMP protocol and not HTTP, so your videos are delivered via a true stream. Unlike progressive downloads, your assets are not stored on the local machine. No longer are your videos delivered as progressive downloads from ordinary web servers – the same servers that dish out your web pages. You'll deliver exceptional visual quality video at very high bit rates.

[Creating Video for the Internet](#)

Creating video for the Internet can be easy once you understand a few basic facts about both the technology used in delivering online video and the visitors to your website who will view your video content. At iPlayerHD, we have done the research so you don't have to. Our recommendations will save you valuable time and effort and will produce the best results.



- **Expert Assistance:** The capability of web browsers to display videos is steadily evolving. Keeping track of how to encode videos so that the greatest number of users can see the highest quality video is challenging. At iPlayerHD, we have dedicated experts who continually research the changing consumer marketplace and monitor the latest technological developments in streaming video. Our experts will teach you how to encode your video to provide the best viewing experience to the most people. We can offer a level of quality and service that is just not available anywhere else, and best of all, we're just a phone call away.

When delivering video content on the Web, your first goal should be to reach the largest audience. When a visitor watches your videos, they should encounter the least amount of difficulty or interruption. To reach this goal, you must begin by choosing a video format.

Flash video formats make this choice easy. Flash Player plays all Flash formats and has a far greater penetration on the world's computers than Windows Media and Quicktime Players. Flash also penetrates firewalls, something the others cannot do. For these reasons, and more, iPlayer as well as social networks like YouTube, MySpace and iGoogle use Flash exclusively.

Flash Video has two different versions, SWF and FLV. Due to several limitations within SWF, FLV is the dominant choice and the one we recommend. Flash FLV can be created using many different encoding tools including those by Adobe, ON2, Sorenson, Quicktime, Riva and several others. Many current video editing software tools include utilities to output content as FLV video for the Web. However, not all of those tools allow you to create videos at bit rates of your choosing. iPlayer allows you to stream video at any bit rate up to 3mbps. If your software does not support unlimited bit rate choices, iPlayer recommends ON2 Flix Standard or Flix Pro. We'll discuss Flix software tools later in this whitepaper.

There are five factors we must consider before we create video for the Web:

1. Flash Version

Flash Player 9. Flash Player 9 is found on 98% of the world's computers, this according to Adobe. However, Flash 9 has an update called Update 3 (F9U3) and we found that only half of all computers have this update. This is very important for you to know as there are two recent HD codecs, ON2's FLV VP6-S and QuickTime's H264 Movies, both of which play very well in iPlayer provided your website visitor has F9U3. Without it, the video will buffer endlessly and never play. Asking website visitors to upgrade their version of Flash is rarely a good idea and usually chases them away. We expect that by mid-2009, all computers will have F9U3. In the meantime, we advise using codecs that reach the largest audience. Unless you are certain that your target audience is equipped with F9U3, VP6-S and H264 will simply have to wait.

You Tube recently announced they are switching from Flash FLV to H264. This major change will motivate hundreds of millions of people worldwide to upgrade their version of Flash Player making the use of H264 much more feasible.

VP6-S vs. H264 MOV. If you decide to deliver VP6-S or H264, there is more you need to know. VP6-S is an FLV format while H264 MOV is a QuickTime format. Both play exceptionally well in iPlayer. *And both formats were created specifically so you could deliver your HD content on the Web but are excellent for SD video also.* We have conducted significant testing of these two formats and have found that playback performance (less stuttering) was marginally better for VP6-S on most machines while visual quality was obviously better for H264 on all machines. Which one do you use? When Flash 9 Update 3 is on all computers worldwide, the choice will be clear: H264.

VP6-E. This is ON2's other codec that works well with both SD and HD video. VP6-E requires Flash 8 and will play on any version of Flash 9. Therefore, 98% of the world



will successfully see your SD and HD video content. To create VP6-E, you will use ON2's Flix Standard, a single-pass software at a cost of \$39, or Flix Pro, a two-pass software at \$239 (PC and MAC versions are available). Both can be purchased through iPlayerHD's "All the Details" web page where you will find a link to On2's website. Note that VP6-E uses more processing power than other FLV codecs including VP6-S to play back smoothly. Still, in our tests on iPlayer, in regular screen mode most machines experienced little or no stuttering with mild occurrences of stuttering in full screen.

Summary. For standard digital video, we recommend any of the many FLV codecs created for SD video. To deliver SD and HD video with the highest quality, to the largest audience, we recommend VP6-E. All of the video on the iPlayer sample is VP6-E FLV.

2. HD Video Resolution

There are various HD resolutions, including 480, 720 and 1080, and each has a different processing requirement when compressed to FLV for the Web. The higher the resolution, the more processing that is required. Much less processing is required using a smaller resolution – Divide 1920 x 1080 by a factor of 3 and the resolution is 640 x 360. 1440 x 1080 should also be encoded at 640 x 360. This reduction in resolution will make your video play much smoother and as you will learn, the visual quality of your video on the Web is more about the encoded bitrate than it is about the resolution. In the not-too-distant future, when the majority of machines connected to the Internet have HD monitors, advanced processors and extremely high connection speeds, delivery of 1080 HD video will be common.

Converting 1080 and 720 to 480 is easy if the tools exist in your FLV encoder. Flix Standard and Flix Pro allow the user to "maintain aspect ratio" and choose the video size. Here is what I did on the iPlayerHD sample page. All of the videos were originally 1920 by 1080 or some other widescreen resolution. I divided both numbers by a factor of 2.25 to 3 so that the result is 640 x 360. The resulting encodes provided excellent video quality but the amount of processing required by my site visitors is significantly less. DV Video at 720 x 480 can remain at the same resolution.

Deinterlacing. All SD and HD video must be deinterlaced if it is to play smoothly on the Web. Deinterlacing is often done in the final edit rendering phase and may also be done in the transcoding to FLV phase. Deinterlaced video resolutions contain a "p", which stands for "progressive" after the resolution number, i.e., 720p where interlaced have an "i" as in 1080i. ON2 Flix Pro has an excellent deinterlacing tool.

3. Internet Connection Speed

Our research concludes that over 85% of all computers have a connection speed greater than 750kbps with the average to be well over 2mbps. While the average Internet connection speed has increased dramatically in the last several years, the speed necessary to view true Web HD is still out of reach for many. iPlayer provides the ability to detect a user's bandwidth while streaming videos, which means those with faster Internet connections can receive your highest quality video while those with lower speeds can still receive video with little or no buffering. To reach the largest audience, we recommend you encode and upload each video with at least three bit rates: 500, 1000, and 1500.

One minute of video, encoded at 1,000kbps (equals 1mbps) equals about 8MB in file size. That should help you calculate the size of your files.



Buffering. Buffering occurs before a video plays to allow enough data to stream so when the video begins to play, it plays through without stopping. Buffering that occurs after the video begins is typically the result of inconsistent bandwidth and is more prevalent on cable/broadband and DSL than on fiber optic (FIOS). iPlayer compensates for this with [bandwidth detection technology](#). The iPlayer detects the bandwidth before the video plays and delivers a video with a bit rate of about 300kbps less than the detected speed. “padding” eliminates most occurrences of buffering.

4. Computer Processor

Stuttering. Stuttering occurs when video frames are skipped because a computer’s processor cannot keep up with all of the data it is attempting to consume. It also occurs far more often in full-screen mode than in regular screen mode. VP6-E, which we recommend for SD and HD video, is an advanced FLV codec with some minor stuttering, mostly in older machines and in full screen only. But the quality of the video and the fact that 98% of the world will see this format far exceeds any minor stuttering issues.

The Flash format is a CPU hog. To minimize stuttering, in your edit system, be sure to render your timeline to non-drop frame.

There are far too many configurations of machines, processors, video formats and resolutions to chart in this whitepaper. Many would find the information very confusing. Frankly, the information is unnecessary. If you follow our recommendations for the formats to use, you will successfully reach the largest audience with superb video.

5. An HD monitor

Do you have an HD monitor? If you do, you are part of the significant minority. Very few computers are equipped with HD monitors, monitors that are necessary to view true HD content. In a few years, we’ll all have them. I recently purchased an HP HDMI monitor with a 1920 x 1080 resolution that cost under \$500 at Best Buy. I love it! Still, that’s a lot of money for most folks – even me, but my business required the purchase.

[Embedding the iPlayer Screen in your own website.](#)

One of the most exciting features of iPlayer is for those who prefer not to use the iPlayer skin and web page but instead desire to embed the iPlayer screen and technology into their own web pages. iPlayer’s Embed feature allows you to embed the player on any number of web pages on any website and still benefit from our Flash Servers and all available technology including instant-on and bandwidth detection. To use this feature, create your channels just as you would to create an iPlayer except you do not need to upload a thumbnail image. Once your channel is created, click on the “Embed” link to the right of the Channel name that you want to embed. Next, create your embed code, choosing the full-screen and streaming vs. progressive options as well as the automatic play. You’ll then need to size the player to fit the web page on which you’ll embed the player. Be sure the numbers you use match your video’s aspect ratio. Then click “Generate HTML.” That HTML can be easily placed on any web page.

[For those who have their own embedded video players in their web pages](#)

iPlayer customers who have their own embedded Flash dedicated players may use our Flash servers for the delivery of video on those players. However, the bandwidth detection is not an



option for this application. Those with Windows Media and Quicktime Movie players embedded in their web pages may use the progressive download features in their iPlayer accounts. Every video uploaded into your account generates a unique URL that may be used to link to any player. We will provide the necessary HTML tags to deliver such content.

[Support](#)

If you have any questions about this Whitepaper or about any of iPlayer's many features, feel free to contact us at 603 778 7000 or use our [Contact Page](#).

Our experts at iPlayerHD will teach you how to create robust Flash Video as FLV VP6-E using Flix Pro. We'll also teach you how to create HD content in H264 using QuickTime 7. We're just a phone call away. Its easy and its free once you've signed up for a free ten-day trial account.

Let the experts at iPlayer HD help you deliver the best possible video experience to your website visitors.

Using iPlayer

Overview

iPlayer enables you to deliver video either with the iPlayer skin or by embedding your videos directly on any web page or pages of your choice. Let's first discuss the skin.

An iPlayer skin is actually a web page just like you see when you go to the iPlayerHD.com website except the iPlayer logo above the screen will be replaced by your logo or anything you choose to place there. Also, the content area below the screen will be replaced with your content, if any. If you choose not to place content below the screen, then your playlist, which includes all of the Channels you place on the page, will appear immediately below the screen. iPlayer currently offers one skin. In the near future, we will offer several more. In any case, your iPlayer is branded by you, for you.

The other method for delivering video is by embedding your video in your web pages. Embedding is fast and easy. You'll generate the embed code after you have created your channels by uploading the videos into your account. Simply copy the code for each channel you create and deliver it to your web developer who will embed the player onto your web pages. Or, if you manage your own web pages, then do it yourself. There is no limit on the number of pages on which a channel may be embedded.

Your iPlayer account includes 5GB of storage. As you'll soon learn, that is about 70 videos. It is only your uploaded videos and images that effect your storage. Creating iPlayers and embedding your channels in web pages has no effect on your storage. You may have as many iPlayers as your desire in your 5GB account. Each iPlayer may contain an unlimited number of channels with 12 to a page. You may add the same channel to any number of iPlayers without affecting your storage capacity.

Every video you upload will become a channel. If you plan to put a channel on an iPlayer skin, you must have a thumbnail image to represent the channel in the playlist area of the page. Using your graphics program, crop and resize a screenshot from your video so that it meets the 236 x 136 pixel requirement for the page. For an example, refer to the iPlayerHD.com page. The thumbnails on that page are all 236 x 136 because that is the space allocated. Any other size will be forced into that space and will appear incorrectly.

If you do not plan on using the iPlayer skin, and you plan only to embed, you do not need to upload a thumbnail image to create a channel.



Preparing your videos

Every channel you create has six bit-rate slots. Bandwidth detection will deliver the appropriate video to those watching your videos. Those slots are:

0 - 500
501 - 800
801 - 1100
1101 - 1500
1501 - 2200
2201 - 3000

You must upload a video into at least one slot to activate your channel. iPlayer recommends that you encode your videos with at least three bandwidths: 500 kbps, 1000 kbps (1.0 mbs) and 1500 kbps (1.5 mbs). Our research indicates that the large majority of your site visitors have high enough bandwidth to be delivered the 1.5 mbs videos.

Using your Flash encoder, create the videos at the recommended bit rates and be sure to include the bit rate in the name of the video file for easy reference. Once encoded, there is no way of knowing the bit rate unless it is included in the name. We recommend using two-pass software to increase the video quality. Encode at a constant bit rate as it is most compatible with streaming video. Be sure your videos are progressive and not interlaced. A key frame rate of as low as 1 times your framerate ($29.97 \times 1 = 30$) but no higher than 5 ($29.97 \times 5 = 150$) will insure very good quality. Many encoders offer the VP6 FLV codec (VP6-E is the actual version) as an option and we recommend you use that. Avoid using H264 and VP6-S for the reasons described above.

You'll also want to consider your video's dimensions and the size at which you'll encode. If your video is 1920 x 1080, it is best that you not attempt to deliver that size over the Web for reasons described in the Whitepaper. Divide both width and height by a common denominator – in the case of the videos presented at iPlayerHD.com, we used 3 as the common denominator and the result was 640 x 360. 1440 x 1080 videos should also be sized to 640 x 360. Remember, iPlayer respects all aspect ratios while filling the screen to the maximum without distorting the image. If your video is 720 x 480, encode at 740 x 480.

One minute of video, encoded at 500 kbps, equals about 4 MB in file size. At 1000 kbps, the file would be 8 MB and at 1500, the file would be about 12 MB. Therefore, following our recommendations, a channel minute equals about 24 MB. With 5 GB of storage ($5,000/24$), you've got 208 one minute channels. If your average channel is three minutes, that's 70 channels.

Creating a Channel

Login to your iPlayer account.

1. Click "Channels".
2. Click "Add a Channel".
3. Give your Channel a name
4. Browse your computer for the Channel's thumbnail image – you may skip this step if you plan to embed your channel and not use the iPlayer skin.



5. In each of the bit-rate slots for which you have encoded your video, "Browse" your computer for your video files. For example, if your video has a 500, 1000 and 1500 kbps encoded file, browse each of those slots and place the video name in the slot.
6. At the bottom of the page, click "Save". A blue progress bar will indicate that your files are uploading. **DO NOT LEAVE THE PAGE!**
7. Once uploaded, you may continue to create channels or you may create an iPlayer.

To Create an iPlayer

1. Click "iPlayers".
2. Click "Add an iPlayer".
3. Give your iPlayer a name.
4. The three Flags listed can be changed simply by unchecking them.
 - Active – you may deactivate (without deleting) an iPlayer.
 - iPlayer defaults as a streaming video. You may change this to progressive download.
 - Full Screen mode may be deactivated here. Users will not be able to take your video to full screen.
5. Banner Image – If you desire your logo or company name to appear above the iPlayer screen (see the iPlayer.com home page for an example), create it as 200 x 80 pixels jpeg or gif and upload it here. The image must have a solid white background with your company name or logo on the white background. A banner image is not required.
6. Page Content – Use this text editor to create your content. You may easily add text, images, and hyperlinks to other web pages in the editor. You may leave your content area blank.
7. Channels. To add a channel to your iPlayer, simply drag it from "Available Channels" and drop it into the "Channels in this iPlayer" column. The channel at the top of the list will be in the top left position in your iPlayer's playlist/channel area and will be the one to auto play. All other channels in your playlist must be manually activated to play by your site visitors.
8. Click Submit.

Creating Embed Codes

1. Go to Channels.
2. Locate the name of the channel you wish to embed.
3. Click on Embed to the right of the channel name.
4. Choose your options:
 - * Allow full screen is the default. Uncheck this if you do not want full screen capability.
 - * Use streaming is the default. Uncheck if you prefer progressive download.
 - * Start automatically is the default. Uncheck if you wish manual start – a play button will appear on the video screen.
 - * Player width and height are defaulted at 768 x 432 and can be changed to any size. Resizing of the screen is a function of the ratio of the video and the size of the web



page. You'll fit the width of the screen to the web page in which it will be embedded. Be sure to change the height to a number that respects the aspect ratio. The simplest way to do this is to use a common denominator.

5. Click Generate HTML. Copy the code for embedding and you're done!

Media Files

iPlayer's video servers can also deliver video directly to your website's embedded Flash, Windows Media and QuickTime players. Each video you upload into your media files generates its own url. Simply link the url to your player and we'll deliver the video at up to 3mbps. You can also choose to deliver the url of your video to anyone you choose and they can watch it directly in their own media players. Media Files are delivered via progressive download and are not streamed. Bandwidth detection is not an option in Media Files.